TRINIDAD AND TOBAGO

ADMINISTRATION REPORT

of the

DIRECTOR OF AGRICULTURE

for the Year

1947

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AGRICULTURE

Administration Report of the Director of Agriculture for the year 1947

Agricultural Policy

The report of the Agricultural Policy Committee of Trinidad and Tobago, accepted by Government in 1945, fully describes the aims and ideals towards which agricultural effort should be directed. The speed with which such aims may be attained depends largely upon the availability of trained staff and of funds. Progress is detailed in Section II of this Report but the handicaps being suffered through a depleted staff must be evident. Likewise, although valuable preliminary work continues on the establishment of a Central experiment Station there is the danger of the value of such preliminary work being dissipated if it is not followed up at an early date by the implementation of the permanent scheme.

2. Practical steps to further approved policy undertaken during the year have included the creation of further Land Settlement Schemes on a leasehold basis and considerable progress has been made with the training and efficiency of a reorganised District Extension Staff.

3. With the accepted report of the Agricultural Policy Committee as the main source of guidance, the following summary, which appeared in my 1945 Administration Report, is repeated as showing the main lines upon which agricultural policy continues to be directed :—

(i) To prevent the exploitation of the soil and to endeavour to improve its productivity under agricultural management.

(ii) To encourage the production of local food crops bearing in mind the importance of nutritionally desirable foods both for man and livestock, to supply improved planting materials and to advise upon methods of production.

(iii) To encourage the maintenance of livestock in increased numbers and of improved productive capacity in the interests of the improved nutrition of the people and of soil fertility and to conduct investigations towards these ends.

(iv) To aid the established sugar cane, coconut, cocoa and citrus industries by assistance in the supply of improved planting material and of technical advice based on the results of field experiments.

(v) To prosecute investigations designed to expand the range and improve the quality of economic crops both for export and local consumption by field trials of indigenous and imported species.

(vi) To encourage a healthy outlook on agriculture as a mode of life by the expansion of vocational education in agriculture and the creation of an informed extension service. To facilitate settlement on the land under secure tenure.

(vii) To stimulate cooperation amongst agriculturists with the object of cooperative marketing and to provide a channel for the granting of financial assistance to productive enterprises.

SECTION I—AGRICULTURE IN THE COLONY IN 1947

General Conditions

The early part of the year was exceptionally dry and resulted in many uncontrolled fires which raged through Food Allotments, cocoa cultivations and forest lands. The second half of the year was also less wet than usual but it provided good conditions for cocoa, the setting of the citrus crop and for food crops.

2. The rainfall for representative localities throughout the Colony was :—

	1947	*Average* 1936-1946
Port-of-Spain	49.77 inches	64.13 inches
St. Joseph, Government Farm	53.65 ,,	65.55 ,,
Diego Martin, River Estate	62.34 ,,	71.82 ,,
Carapichaima, Waterloo	47.00 ,,	62.99 ,,
Couva, Esperanza	49.88 ,,	73.05 ,,
Naparima, Ste. Madeleine	59.51 ,,	65.08 ,,
Siparia, Police Station	43.89 ,,	65.59 ,,
Cedros, Perseverance Estate	39.83 ,,	59.19 ,,
Toco, Police Station	58.41 ,,	80.82 ,,
Rio Claro, Police Station	49.91 ,,	98.93 ,,
Tobago, Botanic Station	57.83 ,,	82.59 ,,
	52.00 inches	71.79 inches

3. *Labour*—There was a steady return of labour to agricultural work and a steady improvement in the quantity and quality of the work performed. Apart from an unofficial strike which was confined to a part of the central sugar belt during the latter part of the crop season, there were no major labour disturbances in agricultural industries during the year.

Agricultural Products for Home Consumption.

Food Production

4. The gradual replacement of the temporary war gardens by permanent food allotments has continued and local food production although not reaching self-sufficiency, was maintained at a satisfactory level.

5. *Provision Crops*—There was a temporary shortage of the bulky provisions at the close of the dry season from May onwards and this seasonal trend was somewhat accentuated by the prolonged drought. Outside of this period, however, there was a fair supply of one or other of the local starchy crops. The production of good type yams is improving and in areas where cocoa is being replanted there are increases in the production of tannias. Eddoes were in ample supply but a decreased acreage prevented the former October-November gluts of this crop. The sweet potato crop from Tobago which normally helps to meet Trinidad's requirements in July, August and September showed a further decline.

6. *Grain Crops*—Record plantings of rice and corn were made and safely harvested. It is estimated that over 20,000 tons of rice were produced and this figure would have been higher still had rainfall been heavier in the early growing season. Drought conditions and consequent fires left much land ready to receive a quick crop of maize when the rains commenced with the result that a record acreage was planted and satisfactorily harvested. The Marketing Division of the Department of Agriculture alone purchased over 3,000,000 lb. of dry shelled corn under the terms of Government's guarantee to purchase unlimited quantities of certain specified crops.

7. *Vegetables*—The increase in vegetable production and consumption was one of the notable events of the year. Cabbage, cauliflower, tomatoes and salad beans were available throughout the year although naturally they were more plentiful in the dry season than in the wetter months. The improvement was due largely to favourable weather but a contributory factor was the extension of plantings from the old established areas to new areas. The supply position during the dry season allowed the export of some vegetables, chiefly to Barbados and British Guiana.

8. *Other Crops*—Pigeon pea remains the chief pulse and although extensively cultivated, the market is not over supplied.

Production of bananas and plantains still falls short of local demand. Of the banana varieties, Gros Michel and Sucrier have suffered from Cercospora disease but the planting of the Silk Fig is increasing as is also the Mysore, the latter primarily as a source of stock feed.

Livestock

9. *Diseases*—There were no outbreaks of proclaimed diseases during the year. One suspected case of Anthrax was reported at Mayaro, but investigation proved otherwise. There was only one report of Swine Fever which proved negative when investigated. Vaccination with Crystal Violet Vaccine as a precaution against Swine Fever is now a routine practice on Government Farms and this service is also available to the public, 237 pigs being vaccinated during the year.

10. Tuberculin testing of cattle was continued and of 2,274 tested, there were 232 reactors. This testing is carried out primarily in connection with milk for sale and all reactors are slaughtered, Government paying partial compensation.

11. *Importation of Animals*—The following animals were imported into the Colony during the year and were inspected by Government Veterinary Officers :—

Animals for food

Type	*Source*	*Number*	*Total*
Cattle	...British West Indies	40	
	Colombia	3,495	
	French West Indies	4	3,539
Goats	...British West Indies	11,066	
	Venezuela	1,808	12,874
Sheep	British West Indies	2,165	
	Venezuela	55	2,220
Swine	...British West Indies	4,360	4,360

Animals for Breeding and Work

Cattle	...British West Indies	1	1
Mules	...British West Indies	46	
	...French West Indies	18	
	...United States of America	91	155
Asses	...British West Indies	89	89
Horses	...United Kingdom	20	
	Canada	12	
	British Guiana	3	
	British West Indies	46	
	French West Indies	1	
	United States of America	6	88
Goats	...United Kingdom	5	
	British West Indies	6	
	United States of America	5	16
Sheep	...British West Indies	4	
	French West Indies	8	12
Swine	...United Kingdom	6	
	United States of America	2	8

12. In addition, 96 dogs were imported during the year of which 75 came from the United Kingdom.

13. The importation of live cattle for slaughter has decreased from 16,547 head in 1945, 5,526 head in 1946 to the figure of 3,539 in 1947 quoted above. This marked decrease has been offset largely by the increased importation of frozen meat but there has also been an increased consumption of local beef. To safeguard local breeding stock, the Slaughter of Livestock (No. 2) Order, 1942, controls the slaughter of female stock.

14. *Livestock Shows*—Livestock shows held during the year included seven shows held at various centres in the Sugar Belt primarily for peasant cane farmers and the annual shows of the Goat Society and of the Poultry Association. Livestock also formed an important section of the Tobago Agricultural Society's Show.

Agricultural Exports in 1947

15. The total value of Agricultural Exports shows an increase over the previous three years as will be seen from the figures given below :—

1947	$ 16,872,844
1946	12,351,877
1945	9,876,651
1944	7,892,910

The increase of $4,520,967 over the 1946 figures is made up chiefly of a gain of $2,134,332 in respect of sugar and its bye-products and a gain of $2,031,623 in respect of cocoa.

16. Sugar and rum alone account for nearly $10,000,000 of the total value of the 1947 exports.

17. The detailed exports for the year 1947 follow :—

		Quantity	*Value* $	*Value* $
SUGAR AND BYE-PRODUCTS				
Sugar	...ton	89,664	8,111,099	
Molasses	...lb.	—	—	
Rum	...p. gal.	844,910	1,846,235	9,957,334
COCOA				
Raw Cocoa	...lb.	9,009,644	3,205,049	
Cocoa Butter	...lb.	500	278	
Prepared Cocoa	...lb.	1,536	915	3,206,242
CITRUS				
Lime Oil, distilled	...lb.	12,698	68,931	
Lime Oil, handpressed	...lb.	—	—	
Raw Lime Juice	...gal.	67,310	48,913	
Limes, fresh	...lb.	4,398	538	
Citrate of Lime	...lb.	209,440	17,496	
Grapefruit, fresh	...No.	9,081,436	366,401	
Oranges, fresh	...No.	4,708,746	78,000	
Grapefruit Juice	...gal.	473,654	478,045	1,058,324
TONCA BEANS	...lb.	204,176	196,515	196,515
RUBBER, RAW	...lb.	324,899	221,296	221,296
COFFEE				
Raw Coffee	...lb.	1,265,675	250,014	
Prepared Coffee	...lb.	49,435	16,311	266,325
COCONUTS AND COCONUT PRODUCTS				
Copra	...lb.	—	—	
Edible Oil	...gal.	181,342	297,934	
Coconut Oil	...gal.	546,510	789,022	
Margarine	...lb.	253,373	88,278	
Lard Substitute	...lb.	193,506	102,072	1,277,306
SOAP STOCK	...lb.	197,166	26,621	26,621
SOAP, HARD	...lb.	627,986	82,159	82,159
FRESH VEGETABLES	...lb.	322,133	64,318	64,318
FRESH FRUITS	...lb.	102,001	5,822	5,822
BANANAS	...stems	1,495	4,401	4,401
PEAS AND BEANS	...lb.	—	—	—
LIVESTOCK AND HIDES				
Livestock	...	—	16,356	16,356
Leather, undressed	...lb.	—	—	
Hides	...lb.	27,200	2,984	2,984
BITTERS	...p. gal.	39,236	378,925	378,925
HONEY	...lb.	71,177	11,219	11,219
MISCELLANEOUS	...	—	96,697	96,697
	TOTAL VALUE OF EXPORTS			16,872,844

Sugar

18. *Production*—The sugar output in 1947 was 110,068 tons compared with 109,603 tons in 1946 and 76,347 tons in 1945. The increase in output was disappointingly small in that a crop of 125,000 tons had been estimated, the shortfall being due to drought conditions and a certain amount of damage by froghopper.

19. Rains at the commencement of the crop season were responsible for poor juice quality which however improved as the crop progressed but the average outturn for the season was still comparatively high at 9.62 tons of cane per ton of sugar.

20. Seven hundred and thirty-seven thousand four hundred tons of estate canes and 321,818 tons of farmers' canes were ground during the season and the amount of canes unreaped and left as standover canes was negligible. The average acre yield of *estate* canes was 24.80 tons compared with 25.28 tons in 1946 and the low figure of 19.83 tons in 1945. The average acre yield for farmers' canes is not available but it is lower than that of estate canes due to the fact that fertilisers are applied only on a limited scale and that many more ratoon crops with their lower yields are taken off than is the case under normal estate management.

21. Of the 110,068 tons of sugar produced, some 20,000 tons were allocated for local consumption and the balance was purchased by and exported under the direction of the Ministry of Food principally to the United Kingdom and to Canada.

22. The price for export sugar was raised by $22.80 per ton following negotiations in London between the British West Indies Sugar Association and representatives of the Ministry of Food. The increase was granted subject to the condition, mutually agreed upon, that provision should be made for the establishment of certain funds to be built up by means of a levy at the agreed rate of $13.20 per ton of sugar exported.

23. The funds, and the allocations of the levy, are as follows :—

Price Stabilisation Fund ...	... $6.00 per ton
Rehabilitation Fund ...	... $4.80 per ton
Labour Welfare Fund ...	... $2.40 per ton

Thus of the $22.80 increase in price, $13.20 was set aside for the creation of the funds and $9.60 was available for an immediate cash increase in the value of export sugar.

24. *Price of Farmers' Canes*—With the termination in 1945 of the payment of planting subsidies and in 1946 of the payments from public funds to sugar manufacturers on account of interest and replacement charges, the industry has stood firmly on its own feet. The Production of Cane and Sugar Ordinance No. 9 of 1944 was replaced by the Production of Cane Ordinance No. 61 of 1946 and the Third Schedule to this latter Ordinance contains the rules for determining the price of farmers' canes and under these rules, the price declared was $6.52 per ton of cane.

25. This shows a slight drop from $6.77 per ton of cane payable in 1946, but in the new Ordinance, interest and depreciation and obsolescence are fully charged to the industry. Other factors depressing the price were the low total production and the comparatively high rate of outturn of tons cane per ton/sugar.

26. *Labour Situation*—Apart from an unofficial strike during the latter part of the crop season in the central sugar belt which caused some trouble during the few weeks it lasted, the labour situation in the Sugar Industry remained normal.

27. During the year, the Sugar Manufacturers' Association of Trinidad (Incorporated) negotiated a new wage agreement with the All Trinidad Sugar Estates and Factories Workers' Trade Union. By this agreement, the crop time bonus of 10 per cent. granted in 1946 was replaced by the concession of an increase of 15 per cent. on basic earnings (1946 rates) to all members. This, together with the 15 per cent. increase granted in 1945, resulted in the 1947 wage rates being 30 per cent. above 1944 irrespective of the War, attendance and/or output bonuses which remained unchanged.

Cocoa

28. Exports of raw cocoa during the calendar year were 9,009,644 lb. compared with 6,626,962 lb. in 1946 and 7,731,824 lb. in 1945. Estimates for the crop year October 1947 to September 1948 originally placed at 12,000,000 lb. have already been raised to 14,000,000 lb.

29. The incentive for the increasing production is obvious in the satisfactory prices now ruling and in the indication that, owing to the low World output of cocoa falling below total demand, good prices should be payable for some years to come.

30. These better prices have encouraged many cocoa estate owners to reclaim their plantations from the semi-abandonment consequent on years of low prices, low yields and the ravages of disease.

31. Prices paid directly to the producer increased steadily from $28.00 per fanega of 110 lb. in January to $41.00 per fanega in December showing a very welcome increase from the low figure of $13.25 per fanega which ruled unchanged throughout the war years.

32. The value of good prices to the industry, and to the Colony, is reflected in the following figures and in particular the returns for 1938 should be compared with those of 1947 :—

Year	*lb. Exported*	*Value in $*
1938	42,436,447	2,369,285
1944	10,622,633	1,411,796
1945	7,731,824	1,080,047
1946	6,626,962	1,171,781
1947	9,009,644	3,205,049

33. Witches' Broom disease accounted for less damage than usual due to a prolonged dry season and also to the greater care now being paid to cultivations.

34. The Government Cocoa Rehabilitation Scheme whereby assistance is given in the replanting of those areas best suited to cocoa with high yielding plants made further progress and 105,995 rooted cuttings were issued to the field compared with 70,000 in 1946 and 90,000 in 1945. Under the scheme assistance is also given to the rehabilitation of land in crops other than cocoa where the land is considered unsuitable for replanting in cocoa and the majority of the applications received so far in this connection, have been for the planting of citrus.

Coconuts

35. With the price of copra maintained at $7.00 per 100 lb., work has continued in bringing estates back to maximum production and the benefits of a price stabilised at a satisfactory figure are reflected in the following figures of the amount of copra milled each year :—

Year	*lb.*
1943	21,670,531
1944	29,313,693
1945	38,916,669
1946	39,617,401
1947	40,033,078

36. Again no copra was exported as such, total production being delivered to the factories for oil extraction and processsing. Utilisation of the raw oil produced included the manufacture of the following products :—

Edible Oil	1,556,050 gallons
Lard Compound	1,388,472 lb.
Margarine	129,975 lb.
Butter Substitutes	376,494 lb.
Laundry Soap	8,845,997 lb.

37. Exports of copra products were again, under the terms of the Oils and Fats Conference held in Barbados limited to the Caribbean Area and their value was $1,277,306. These exports were available after fully meeting all internal requirements.

38. The prolonged drought experienced early in 1947 had a marked adverse effect later in the year on the size of the nuts harvested and on the yield of copra and this will doubtless be reflected in the outturn of copra in 1948. Provisional estimates for 1948 show that total copra produced may fall to some 28,500,000 lb. which amount would barely meet internal requirements.

Citrus

39. The extent and diversification of the citrus industry is well exemplified in the list of products exported as shown in paragraph 17 above the value of which totalled $1,058,324.

40. A welcome feature of the year was the resumption of the export of fresh fruit to the United Kingdom market, a trade which had necessarily been held in abeyance during the War Years.

41. The Cooperative Citrus Growers' Association canned 175,535 cases of juice during the year of which 21,418 cases were consumed locally and the balance exported to the United Kingdom and the Caribbean markets. They also packed 97,192 crates of fresh fruit for export.

42. The grapefruit industry is a young one and good cultivation and adequate manuring are reflected in excellent outturns of good quality fruit.

43. Considerable plantings of Valencia oranges are now reaching maturity and arrangements are being made for a trial shipment of fresh fruit to the United Kingdom market in 1948. Under Trinidad conditions, this orange is in prime condition for shipping in April/May/June at which time of the year it should find a ready and lucrative market.

44. The lime industry continues to decline due principally to the premature dying out of trees recorded in previous reports. Work on measures to combat this condition are reported in Section II of this report.

Other Crops

45. *Tonca Beans*—There was no market for these beans during the early part of the year but buying commenced later at the reduced price to the producer of 50 to 60 cents per lb. compared with $1.00 per lb. in 1946. Exports during the year totalled 204,176 lb. valued at $196,515.

46. *Coffee*—Exports of a fair crop were maintained at 1,265,675 lb. valued at $250,014 compared with exports of 1,287,000 lb. in 1946 and 1,319,362 lb. in 1945.

The drought conditions in 1947 seriously affected this crop and it is doubtful whether there will be any surplus over local requirements for export in 1948.

47. *Rubber*—With export during the year of 324,899 lb. valued at $221,296 the war time prosperity of this industry has now come to an end. The agreement whereby all rubber produced was made available to the Government of the United States of America through the agency of the Rubber Development Corporation expired on June 30th 1947. Under this agreement the basic price paid was 48 cents U.S. currency per lb. for Hevea ribbed smoked sheet of first quality and, in addition, production bonuses were payable whereas the present World price for this commodity is totally uneconomic under Trinidad conditions.

SECTION II—WORK OF THE DEPARTMENT OF AGRICULTURE

48. Shortage of trained staff has continued to be a serious limiting factor to the rate at which progress can be recorded. This has been most strongly felt on the specialist staff of the Chief Scientific Officer which at the end of the year showed six vacancies in a total of eleven senior appointments.

49. The District Extension Staff, although not at full strength, has not suffered to the same extent and good progress was made with the conversion of the former "War Gardens" into permanent food allotments. The substitution, as from 1st January, 1947, of an economic rental for the wartime nominal rent of $1.00 per acre, proceeded smoothly and was accepted by the honest gardener as fair and reasonable. These new tenancies are only offered on lands suitable for permanent gardening and they pave the way for the introduction of a system of long term leases whereby the good tenant may obtain security of tenure and settle permanently on the land.

District Work

50. The activities of the district services have included normal work on crops for both export and local use, a continuance of the detailed Crop Survey of the Colony and supervision of cocoa rehabilitation. Other activities are summarised by Dr. F. J. Pound, O.B.E., the Senior Agricultural Officer, as follows:—

51. *Fodder Crops*—A notable feature of the year was the initiation of a campaign to encourage the planting of Guatemala grass or Elephant grass on small holdings where stock find fodder scarce in the dry season. On the district stations excellent demonstrations of these grasses and tropical Kudzu were maintained and plots of fodder were planted around most of the rural Breeding Unit Stations.

52. *District Stations*—The small demonstration plots on land settlements served the usual usefu purpose of giving the staff contact with the gardeners' problems, of giving illustration to new crops and improved methods and of demonstrating the balance between stock and crops on small holdings.

53. The larger district stations, of which two situated at Sangre Grande and at Rio Claro, were in operation during the year, attracted attention and received a continuous stream of visitors particularly when stock were installed and progeny began to arrive.

54. These stations have served the useful function during the year of providing meeting places for staff and farmers, of demonstrating grain crops, fodder crops, and methods of both replanting and rehabilitating cocoa.

Fruit trees and high yielding or disease resistant clonal rubber have grown well but mulberries have been a failure.

55. On the small station in the lagoon at Debe, trouble was experienced in larceny of dry season crops particularly watermelons but some useful data was gathered in respect to rice. By an accident rice seed was rotary hoed into the soil in the dry season and an excellent and early spring resulted which gave a good yield. On this discovery it has been decided in 1948 to explore the possibility of drilling rice seed into beds ploughed in the dry season in place of the more common method of transplanting into flooded fields.

56. *School Gardens*—A new system of assessing school gardens for the award of the Challenge Shield presented annually by the Agricultural Society of Trinidad and Tobago was used which gave credit for continuous effort throughout the year. The result was a very large improvement in the educational value of school gardens which are now rapidly becoming local vegetable demonstration plots.

The Shield was awarded to the Plum Mitan C.M. School.

57. *Food Allotments*—The Crown land food allotments were well taken up and other Crown land, many with derelict crops, were readily rented for rehabilitation of the crops and for food growing. Approximately $10,000 was spent in various improvements, chiefly access, and gardeners have been, well pleased with the work.

58. The demand for land has reached outside of recognised good agricultural land to marginal lands which are now in demand for poultry and stock raising, such lands only being rented on submission, of approved programmes of work.

59. *Staff Training Courses*—Two training courses were held for the staff of the Extension Services. The first, being a preliminary course, was attended by all staff and was held in two centres, one in the northern division and one in the southern. This course lasted two weeks.

60. The second course was of a month's duration for picked men. It was organised as a residential course at the La Pastora Propagating Station and dealt more fully with the duties of the district staff.

61. Both courses were conducted by Mr. J. C. Hotchkiss of the Staff of the Comptroller for Development and Welfare. Lectures were given by the senior staff of the Department and other specialists.

62. *Miscellaneous*—A considerable amount of time was used on various miscellaneous services prominent among which is the assistance given the Resettlement Office in deciding whether applicants for loans to commence farming had the necessary land, ability and experience. Pest control, principally the eradication of parasol ants, love vine and bird vine was given prominence, numerous meetings were organised and staff delivered lectures at meetings organised by the Agricultural Societies and Government Departments.

Marketing, Co-operation and Fisheries Division

63. *Produce*—With only moderate quantities of ground provisions being offered in the early part of the year and itinerant vendors paying producers satisfactory prices, the movement to market was brisk and accordingly the amount of this class of commodity handled by the Marketing Division showed a decrease.

64. As the season progressed and as a result of the prolonged drought, markets became firmer and prices tended to rise. With the appearance of a large eddo crop and small quantities of sweet potatoes later in the year, prices eased but at no time were they depressed by glut conditions.

65. Green vegetables were in good supply during the year and traffickers were able to export fair quantities, chiefly to Barbados and British Guiana, during the dry season which is the season of greatest supply. A few consignments of Canadian cabbage were imported in July-August, the period when the local product is normally off the market.

66. A record corn crop (maize) commenced to come on the market in October and much of this crop was handled by the Marketing Division in honouring Government's guarantee to purchase in unlimited quantities, all dry shelled corn that might be offered, at a minimum price of 3½ cents per lb. During the period October to December, 3,077,400 lb. were so purchased.

67. Purchases of all commodities by this Division totalled 4,033,580 lb. compared with 2,199,635 lb. in 1946.

68. *Stock Feed*—Feeding stuffs were in more plentiful supply and were available from ordinary commercial sources throughout the year. As a result there was a reduction in the demand for a balanced dairy ration prepared and mixed by the Division. Some 407 tons, compared with 658 tons in 1946, were sold direct to stock owners through the Marketing Depots.

69. Some 14 tons of poultry mash comprising in the main local ingredients, were sold during the year.

70. Feeding stuff requirements of Departmental farms and Stations amounting to 446 tons were handled and supplied by the Marketing Division.

71. *Fish*—Only the Matelot Fish Depot was operated by the Division during the year but the large amount of 167,820 lb. of fish were handled by this depot alone compared with 160,115 lb. handled by the three depots operating in 1946.

72. The Toco Depot was handed over to the Toco Fisherman's Association and the Division continued to assist with advice and with the loan of surplus equipment. The Grande Riviere Depot was closed due to the poor response from the fishermen concerned.

73. *Seeds and Planting Material*—Supplies of yam seed, pigeon peas, corn, Mysore banana and plantain suckers, obtained chiefly from Departmental Stations, were distributed through Marketing Depots. Improvement was recorded in the sales of imported seeds. This was due largely to producers making better use of facilities for obtaining their supplies through the Depots.

74. *Cartridges*—Distribution continued throughout the year at centres where commercial facilities did not exist and sales were also made in special areas on request. This service has continued as an aid to farmers in the control of crop pests and vermin.

Co-operation

75. *Agricultural Credit Societies*—For the purpose of administering this work, the Colony was divided into three divisions and the officer in charge of societies in each division was directly responsible to the Marketing and Cooperative Officer who was authorised to exercise the powers vested in the Registrar. There was therefore a reduction of correspondence and the Inspectors had much more time to visit societies and to give the advice and assistance required.

76. The societies' books were kept by the secretaries of the individual societies and the officers and members took greater interest in the conduct and control of the affairs of their societies.

77. Printed half-yearly forms as required by the controlling ordinance for the preparation of financial statements proved very useful. Printed forms for the preparation of applications by societies for loans from the Agricultural Credit Bank were very helpful in giving a picture of the administration of the affairs of societies.

78. There was a big increase in advances to societies over the previous year owing to the increase in the number of societies registered and in view of the fact that a larger number of societies were granted medium term loans.

79. *Number of Societies and Members*—Fifteen new societies were registered during the year, thus bringing the total number to 144. Of these societies, 99 in Trinidad and 19 in Tobago depend upon the Agricultural Credit Bank as their source of credit while the remaining 26 constitute the Ste. Madeleine Group and are financed by the Ste. Madeleine Sugar Company. Aggregate membership of all societies increased to 5,183.

80. *New Loans*—New loans amounting to $418,863 were contracted by 131 societies during the year, $337,160 having been borrowed by 107 societies from the Agricultural Credit Bank and $81,703 by 24 societies from the Ste. Madeleine Sugar Company. Societies in the Agricultural Credit Bank Group made advances to 3,581 of their members for the following purposes—$134,041 for cultivating food crops, $69,935 for canes, $27,322 for other crops, $55,762 for stock and $50,050 for buildings.

81. *Overdue Loans and Reserves*—Overdue loans were reduced to $11,395.48 by the end of the year and all societies' resources then aggregated $67,172.47 having been increased by $8,617.53 during the year.

82. *Agricultural Co-operative Societies*—One new society was registered during the year and there are now nine of these societies, one of which is in liquidation. Aggregate membership of the eight active societies is 1,264 and members' subscribed capital amounts to $188,368. Loan capital borrowed from Government amounts to $63,849 and reserves stand at $75,969. The book value of fixed assets is $182,740.

Fisheries

83. *Staff*—The post of Assistant Fishery Officer was filled in January and appointment of a Fishery Assistant was made in the same month. A Junior Fishery Assistant was appointed in August.

84. *Statistics*—Among statistics collected during the year, an analysis of fishing activities at Matelot revealed that during the 1947 fishing season 77 boats, 8 having outboard motors, made 3,935 fishing trips and caught 216,668 lb. fish.

85. *The Activities of the Division*—Investigational work was done on the use of various new types of gear. Trammel and shark nets, an otter trawl and a 500 hook-palangue were built. These were demonstrated at various beaches. Other work included investigation of problems, educational work on the observance of fishery regulations by fishermen, advising and encouraging fishermen, co-operating with other Government Departments in improving conditions within the industry especially as regards the supply of tackle and gear, and encouragement of cooperative associations.

86. The Toco Fishermen's Association was encouraged and assisted to take over and operate the Toco Fish Depot. Contact was maintained with them and advice and help given throughout the season.

87. *Shark Liver Oil*—In execution of a programme for developing the Shark Industry, further progress was made in extraction of shark liver oil and 69 lb. were produced. This was found to be of high value and some of it has been delivered to the Health Department. Further work will be done in 1948.

88. The Division acquired a launch for demonstration of the use of new gear and for investigational work in connection with fishing. Repairs were completed too late in the year for much to be done but some demonstrations were made and valuable information was gathered.

Experimental Stations and Departmental Institutions

St. Augustine Station

89. The Station has continued its good work in supplying the demand of economic and ornamental plants and in the testing of vegetable and annual crops. Gross revenue for the year was $44,164.65 compared with the record high figure of $45,923.00 for 1946.

90. The Manager, Mr. R. Ross who replaced Mr. R. E. Dean on his transfer to the post of Superintendent of Gardens, Hong Kong, summarises the main features of the year's work as follows:—

91. *Citrus*—Production of citrus plants amounted to 71,000 plants. Of 424 firm orders received, the demand of 277 applicants were met in full. No replies were received to our advice notices in respect of 147 bookings and these orders were cancelled.

Total distribution was 70,049 including standovers from 1946, and approximately 20,000 plants remained as standovers for 1948.

92. Over 140,000 seedling sour orange stocks, together with some sweet seville and rangpur lime for special orders, were lined out for 1948 budding programme.

Stocks suffered somewhat from the severe dry weather experienced during the greater part of the year.

93. *Avocadoes*—A total of 6,505 budded avocadoes of different varieties were distributed—over 2,000 more than the number supplied in 1946. Pollock was the variety most in demand, followed by Lula.

Orders for 5,934 have been received for the 1948 distribution, and it is expected that production will fully cover this amount.

94. *Mangoes*—Orders have been received for 5,470 plants. Distribution of only 1,528 could be made on account of shortage of stocks and stock trees. Orders for 1948 call for 8,142 plants and efforts have been made to step up production by the planting of several stock trees and by budding in the field.

95. *Rubber*—The budding of leaf blight resistant clones on to trees panel budded with the Far Eastern high yielding but susceptible clones continued. Dr. M. Langford of the U.S. Department of Agriculture, Rubber Research Station, Costa Rica, visited the Station during the year and gave useful advice.

96. *Vegetable Seedlings*—The demand for vegetable seedlings in boxes was still strong. Total production amounted to 7,380 boxes.

In connection with the Department's Scheme for testing of new strains of vegetables, 263 boxes and 156 packets of seed were distributed to some 30 market gardeners through the Extension Services.

97. *Ornamental Plants*—Sales of flowering plants, shrubs and hedging plants amounted to 28,876.

98. *Annual Crops*—Seed selection of the three selected types of maize, also of Lasiba and Tobago pigeon peas was continued. The greater part of the selected seed was sold to the Marketing Division for distribution to the planting community.

99. *Sugar Cane*—Twenty-two varieties of Sugar Cane were received from the Plant Quarantine Station for multiplication.

100. *Citrus Fruits*—Revenue for grapefruit and oranges, sold principally to the Cooperative Citrus Growers' Association amounted to $10,433.95.

101. *Miscellaneous*—Work was continued with the vegetative production of *Guava*, fair success being obtained by layering and with cuttings.

102. Successful crops of *Yams* of the Lisbon type were raised using animal drawn ploughs for trenching and ridging. The tubers were inclined to be irregular in shape but yields of 14.6 tons per acre were obtained.

103. A very satisfactory cover crop of *Tropial Kudzu* (*Peuraria javanica*) was established in the citrus Museum block.

Government Stock Farm—Trinidad

104. Mr. A. P. McWilliam, Agricultural Officer, continued as Manager of the Farm except for the period of his vacation leave from February to September, when these duties were undertaken by Mr. J. Dominique, the Farm Supervisor.

105. *General*—The acreage of the farm was increased by 40 acres of Crown Land previously leased to a Paper Pulp Company and upon which bamboos had been established.

106. Additions to buildings during the year included new administrative offices and a modern milking byre in which was installed a De Laval Magnetic Auto-Recording Milk Combine.

107. The goat pens were remodelled into a successful layout whereby each enclosure for does housed four to six females and a run for a buck was erected between each pair of doe enclosures.

108. *Horsekind*—The Trinidad Turf Club presented the "Brown Bomber", a Jamaican born thoroughbred stallion by "Scatter" out of "Kate Crackernuts" to Government during the latter part of the year. He is a fine upstanding animal and should prove a very useful all-round sire. With "Portora" he should meet the demands of breeders in Trinidad in 1948.

109. Service fees for Thoroughbred Stallions were increased to $30.00 for half-bred mares and $40.00 for thoroughbred mares.

110. In pursuance of policy, the major part of horse breeding work of the Department has been transferred to the Tobago Farm and transference of stock included the Hunter Stallion, "Bold Friar" (1940), six brood mares, three jack-donkey stallions and eight jennies.

111. *Cattle*—The pure-bred Sahiwal herd of Zebu cattle was transferred to the Tobago Farm. Work in Trinidad has continued with a view to obtaining a good milker constitutionally adapted to tropical conditions utilising for this purpose the Holstein-Friesian and Zebu cross.

112. All calves are weighed at birth and regularly thereafter and rigid selection of both heifer and bull calves based on milk recordings is enforced. Young bulls selected for growth, thriftiness and general hardiness are also later tested for temperature fluctuations.

113. Thirty-four heifers calved during the year, twenty at three years and under, seven at 3 to 4 years, five at 4 to 5 years and two at over 5 years. The earlier calving heifers were mainly ¾ Bos Taurus blood and had been subject to heavier feeding in early life.

114. With regard to milk yield, four of the heifers were in the 700 gallons class in 305 days and twenty in the over 500 gallons class.

115. The average weekly weight increase of calves under 3 months of age was 7.14 lb. compared with 5.6 lb. in 1946.

116. Cattle strength at 31st December was :—

Holsteins	4
Zebu	26
Grade Holsteins	326
Murrah Water Buffaloes ...	18
Oxen	8

117. *Pigs*—Breeding stock at the Farm was supplemented by the importation from the United Kingdom of one boar and three in-pig gilts from Mess Joan Little's herd of Large Blacks.

118. Pig stock at the end of the year totalled 60 comprised of the Large Black and Berkshire breeds. 179 pigs were sold for breeding purposes during the year compared with 77 in 1946.

119. *Goats*—The Jumnapari goats were transferred to the Tobago Farm and work in Trinidad concentrated on British Alpines and Anglo Nubians. Two Saanen type goatlings were bred to the Trinidad Goat Society's imported pure-bred buck—"Haakon of Weald".

120. Sales of stock during the year totalled 50 and strength of stock at the 31st December was 64

121. *Poultry*—Pens of the Rhode Island Red, White Leghorn and Plymouth Rock breed were maintained. Severe culling reduced total stock to 372 birds at the end of the year of which 242 were chicks.

122. Reference to feeding experiments and the need for animal protein is made at paragraph 194 below.

123. *Rabbits*—The rabbitry was reestablished during the year with the importation of foundation stock from Barbados comprising two bucks and six does of the Flemish Giant breed.

124. *Cultivation and Pastures*—Replantings of fodder included 17½ acres of Elephant grass, 8 acres of Uba cane and 1½ acres of Guatemala grass. The sub-division of the largest pasture was completed to assist in controlled grazing.

125. The following are the numbers of recorded services at the Farm and of stud units at District Stations during the year :—

Thoroughbred stallions to mares	31
Jack donkey ,, ,, ,, ...	42
,, ,, ,, ,, jennies	59
Pure-bred bulls	156
Grade bulls	1,288
Boars	208
Buck goats	680

Tobago Stock Farm

126. Dr. J. L. Shannon, D.V.M., Veterinary Officer, was in charge of this farm throughout the year.

127. The farm was further developed during the year by the transference of stock from the Trinidad Stock Farm. The stock so transferred included the pure-bred Sahiwal herd of Zebu cattle, the Hunter Stallion "Bold Friar", brood mares and jenny donkeys, Jumnapari goats and a small nucleus for a herd of water buffalo.

128. Breeding units were maintained at the Farm and at Mount St. George and at the new District Station at Louis D'Or. The following services were recorded to animals other than Government stock :—

Sire	*No. of Services*
Horse Stallions to Mares	29
Jack Donkey to Mares	40
,, ,, ,, Jennies	131
Bulls	84
Boars	145
Ram Sheep	47
Buck goats	218

129. Alterations to the dairy buildings, the cow standings and bull and calf boxes were completed but the milk processing plant is still incomplete.

130. The irrigated plot of 7½ acres has been an invaluable source of fodder particularly in the long dry season and the area is now completely established under Uganda, Guatemala and Para grasses.

131. Pastures have been improved by an effort to eradicate the "barrack weed" (*Cassia toro*) and by fertiliser application.

132. The Farm staged an exhibit of all classes of livestock at the Annual Agricultural and Industrial Exhibition sponsored by the Tobago District Agricultural Society. Surplus stock was also sold by auction on the same occasion.

Land Settlement Division

133. The Land Settlement Committee held six meetings during the year under the Chairmanship of the Director of Agriculture with the Land Settlement Supervisor in attendance. The Committee was strengthened during the year by the addition of the Director of Works and Hydraulics as a member. The Social Welfare Officer was present, by invitation, at all meetings.

134. The Land Settlement Supervisor, Mr. P. M. Hosten, was on duty throughout the year and his report shows the following points :—

135. Financial provision for development and maintenance totalled $276,000 of which $30,087 was expended on maintenance and $174,674 on development both of established and of new projects. The unexpended balance of $71,239 had been earmarked for the construction of roads and laying of water at the new settlements of Maracas and Bamboo Grove, work which was unfortunately delayed through various reasons.

136. No new sites for land settlement were acquired during the year but Crown Land previously leased to the Nelson Paper Pulp Company was made available for settlement purposes. A part of the area is now being developed as the Bamboo Grove Land Settlement and priority is being given to settlers dispossessed as a result of the widening of the new Southern Trunk Road.

137. The development and allocation of holdings on settlements previously established has continued. The leasehold settlements under this category total 2,238 acres comprising 1,543 holdings. The position with regard to these holdings as at 31st December, 1947 was as follows :—

No. of lots reserved	67
,, ,, ,, rented	703
,, ,, ,, leased	342
,, ,, ,, available for renting or leasing	431
Total ...	1,543 holdings

138. The work of development was mainly in the direction of road construction and water installation. Expenditure of $61,319 was incurred on comprehensive road systems for the Rio Claro and Maracas Valley Land Settlements and $31,281 on a pipe borne water supply for the latter settlement.

139. *Housing*—Repairs were carried out where necessary on the 181 Government houses sited at the La Pastora and Brooklyn Settlements—the only two settlements where houses are provided on the holdings.

140. Three timber cottages each containing two 10 ft. x 20 ft. rooms with pent roof of corrugated iron were erected at the Maracas Valley Settlement, which is designed primarily for the resettlement of ex-Servicemen, in order to test this type of assistance as a means of accelerating such resettlement. The lumber was prepared from cedar trees felled on the settlement and the cottages cost less than $300 each being designed on very simple lines so that they could in due course be used as a nucleus to which the settler could himself add extra rooms, verandah, etc. at a later date. Plans have been submitted to extend such assistance in 1948.

141. On other settlements, settlers themselves erected 176 new houses as compared with 59 in 1946. This increase is partly due to the greater availability of building materials but it does also reflect an increasing desire to live on the land.

142. *Livestock*—There has been a general increase in the number of livestock maintained by settlers and the value of mixed farming is being increasingly realised. At La Pastora where there are 93 holdings, the total livestock kept included 115 cattle, 59 goats, 223 pigs and 1,513 poultry.

143. Demonstration Plots were maintained at La Pastora and at Brooklyn and an Agricultural Station was established adjacent to the Rio Claro Land Settlement.

144. Rents collected during the year totalled $12,275.90 with arrears at 31st December standing at $4,791.97.

Experiment Work and Specialist Division

Central Experiment Station

145. The Chief Scientific Officer, Dr. E. Phillis, reports on the work of the Central Experiment Station and summarises the work of the Specialist Officers as follows:—

146. *Staff*—The chief feature of the year was the increasing shortage in senior staff. The Plant Pathologist went on leave early in the year and was then transferred to the Gold Coast. The Soil Chemist was seconded to British Guiana for a month and then went on long leave returning only in December with medical advice that he must not stay in Trinidad for more than six months for health reasons. The Entomologist proceeded on leave in September and has since been transferred to Nigeria. The Manager of the St. Augustine Experiment Station was transferred to Hong Kong in the early summer, and the Acting Sugar Agronomist was promoted to the vacancy thus caused. Mr. Lucie-Smith was transferred from the District Services to the Scientific Staff as Agronomist but could not take up his substantive post owing to shortages of staff in the District Extension Services and the Marketing Division. The Cocoa Agronomist, although present throughout the year, devoted much of his time to the establishment and supervision of the Cocoa Propagating Station at La Pastora, at Marper near Sangre Grande and at King's Bay in Tobago.

147. *Central Experiment Station*—The development of the Central Experiment Station has not proceeded as satisfactorily as could be wished for. There is urgent need for accommodation for both junior and senior staff as a first stage in development. It cannot be sufficiently emphasised that experimental procedures involving changes from established agricultural practices require constant supervision if they are to be carried out as designed.

148. Experiments on crops suited to the terrace soils have continued. Legumes generally do not thrive. Corn, adlay, hill rice and the millets fare very poorly indeed. There is a slight but quite uneconomical response to pen manure or Ammonium sulphate. Of the grasses so far tried, the Uganda strain of Elephant grass is outstanding. Uba cane, a noted standby for poor soils, fares badly. Kudzu (*Pueraria javanica*) was very difficult to establish in 1946, but 'found its feet' during 1947 and spread rapidly. It has flowered freely and large stocks of seed should be gathered during the early months of 1948.

149. During the War years, much of the 'Centeno' flood plain land was let out to local inhabitants for food gardens. For the first year or two after clearing from cocoa, the land produced excellent crops of corn and pigeon peas but after this crops declined considerably. When the land was taken over for Central Station development its cropping ability was poor. But after deep ploughing with a heavy disc plough, corn gave an excellent crop, with as many as four or five good ears per stem. The apparent infertility of the land under peasant corn was removed by breaking it up. More and more it is becoming obvious that soil texture is the factor controlling fertility on these silty clays, and that once the land becomes compacted, few, if any, roots can penetrate, so that bad plant growth is due not to an infertile soil, but to a soil whose physical condition is such that root room is greatly reduced. Studies on cocoa, immortelle and rubber trees on these flood plain clays all indicate that the roots are entirely on the surface. Thus old immortelle trees sometimes topple over in very rainy weather with a large flat root plate still attached to the trunk.

150. Root studies in lighter soils (*i.e.*, in the alluvial soils of St. Augustine) indicate a very much better root development in depth.

Cocoa

151. *General*—The revival of interest in the reclamation of estates that had been practically abandoned during the War Years is the most noticeable and encouraging feature of the Cocoa industry. No doubt much of this interest is due to the increase in price, which during the year reached the high figure of $44 per fanega (110 lb.).

152. The Cocoa Rehabilitation Scheme distributed over 100,000 plants of heavy bearing clones during the year. The total area replanted under this scheme to date is approximately 600 acres, and applications have been approved for a further 400 acres.

153. *Witches' Broom*—The propagation of Witches' Broom resistant clones is now proceeding rapidly. The present rate of propagation of these resistant plants is approximately 2,500 plants per month, and the major part of the production is being used to establish new nurseries. Witches' Broom in Tobago is slowly spreading and a determined campaign is now in progress to check any further spread. The present high value of cocoa makes control work a practicable possibility.

154. *Virus Disease*—The virus survey has been completed and it is now known that the disease is confined to the North-western part of the Island. The rate of lateral spread appears to be very slow and is mainly by contact, but occasional jumps do occur at distances of over a mile.

155. All plants at the main propagating station, which lies in the virus area, are carefully watched. So far no case of virus has been observed either in the nurseries or among the quarter-million plants already propagated. The Station is further protected by a cocoa free belt of some 1½ miles radius from the Station.

156. *Fermentation*—Investigations on fermentation, with a view to finding a small scale method that will give a satisfactory product with a few pods from a single tree, have been continued. Small samples fermented under "text book" conditions do not yield acceptable products and a further study has now been commenced on the course of fermentation under standard estate practices. Samples are sent both to the United Kingdom and the United States of America, and it is of interest to note that while each individual assayer shows some constancy in preference, there are considerable variations between assayers.

157. *Agronomy*—The agronomy of cocoa has been under constant investigation throughout the year. There have been several attempts to build up humic cocoa soils through mulches but although these have undoubtedly improved the cocoa both in vegetative appearance and in crop, this improvement has fallen far short of expectations. A study of the area of soil treated with mulch and with fertilisers showed that there was considerable stimulation of roots of trees other than cocoa, but no discernible response in the roots of adjacent cocoa trees could be seen. Studies on cocoa root distribution have shown a well marked plate of roots on or close to the surface (particularly where there has been appreciable litter), a very small tap root running down for not more than eighteen inches and usually ending in a hemispherical cup up to two inches in diameter, but with few if any other roots below the surface plate.

SUGAR CANE

158. *General*—The variety B. 34104 accounted for just over one half of the total cane crop last year. The crop was harvested in excellent weather but the prolonged drought hindered the growth of canes for the present year's crop. The average yield per acre continues to be unexpectedly low. There is increasing attention to improved fertiliser practices and cultivation techniques and it is hoped that these may before long have a significant effect on yields of sugar per acre.

159. Contour cultivation is becoming a routine practice on estates in the hilly areas. This should stop the loss of soil by erosion in such areas. An increasing number of fields are being planted in a cover crop, either before the cane is planted or on the banks at the time the cane is planted. Although no gain in yield can be claimed for this practice, weed growth was very much delayed, so that it was possible that the practice might be economically sound in that it reduced costs rather than increased yields.

160. Dry season cultivation and planting technique have stimulated interest in fungicidal treatments for the canes on planting. Preliminary experiments with proprietary fungicides have not indicated any beneficial effects on germination but these experiments are being repeated.

161. *Planting Technique*—Plant and ratoon cane yield figures are now available for the experiments on closer planting, including the planting of long canes. With furrows along the bed no increase in yield either as plants or as first ratoons resulted from planting long canes, provided setts were planted one foot to one-and-a half feet along the furrow. Spacing the setts two feet and three feet apart decreased the yield of plants but not of ratoons.

162. With furrows across the bed no increase in yield was obtained either as plants, first, second or third ratoons by increasing the number of double plants in the furrows from 5 to 6, 7 or 8.

163. *Manurial Experiments*—A long term experiment on the use of Ammonium Sulphate indicates that moderate dressings of this fertiliser (up to 4½ cwts. per acre per crop) give much the same relative increase in crop as when the experiment was started in 1932, and that there are no indications of any deleterious effects on the continued use of this fertiliser.

164. Experiments on the use of Ammonium Nitrate as compared with Ammonium Sulphate show that there is little to choose between them so far as yield response is concerned.

165. Experiments on the effect of time of application of pen manure have given conflicting results. It may well be that the detrimental effects on soil texture when pen manure is applied in the rainy season, as compared with the dry season, are outweighed by the loss of nutrients from manure applied in the dry season before the plants are in a position to make effective use of them.

166. *Froghopper Infestation*—There was a bad outbreak of froghopper (*Tomaspis Saccharina*) during the year and the situation was not improved by the unseasonable weather. Instead of well marked peaks of emergence, there was an almost continuous series of emergencies which made control work difficult. In spite of these difficulties, it is a pleasure to record that on one estate at least, complete control of froghopper has been obtained by the use of D.D.T. Other estates have reported encouraging results with Gammexane. In general, this insecticide has been used as a drift-dust against the adult froghopper in much the same manner as D.D.T. is used, but there are also indications that it might advantageously be used as a soil application to check nymphal emergence.

167. A short description of the control technique using D.D.T. is given at paragraph 196 *et seq.* of this report.

168. *Moth Borer*—The incidence of Moth Borer in cane was last investigated in 1936. Since that time, new varieties of cane have been introduced, some of which may be particularly susceptible to Borer, and the use of insecticides has greatly increased. It was therefore desirable to re-survey the matter, and it was arranged that this should be carried out during the 1947 crop. In 1936 it was found that 2.63 per cent. of all joints were bored by *Diatraea spp.* and it was considered desirable to try to reduce this figure by biological control effected through the introduction of parasites from British Guiana.

169. In the recently completed survey, 4.38 per cent. of joints were bored by *Diatraea spp.* It will be apparent that there has been a decided increase in incidence in the last decade. When individual varieties are considered, the list is headed by POJ.2878, Co.419 and BH.10/12, so that the new Barbados varieties would appear to be more resistant than the older standard canes.

170. *Mosaic Disease*—A 'pocket' of Mosaic disease covering three or four acres was found in farmers' canes early in the year, and this led to an intensified search for mosaic. Much of this 'pocket' could be traced back to infected planting material from a very small area. This 'pocket' is now being eradicated. Only odd isolated cases of mosaic have been found elsewhere and these are destroyed when discovered. For all practical purposes, Trinidad can be counted as free from mosaic.

171. *"Pokkah Boeng" Disease*—A small outbreak of "Pokkah Boeng" disease was reported from one estate, and the infected plants were destroyed. This is the first time that this fungal infection has been recorded in Trinidad.

172. *Soil Survey*—The soil survey of the Cane areas is proceeding steadily. There remains only the undulating Ste. Madeleine lands and the Oropouche Lagoon area to be surveyed.

Citrus

173. *General*—There is little to report concerning citrus other than the observation that the acreage devoted to grapefruit and oranges is extending rapidly. Small outbreaks of scab have been noted and it is planned to investigate the economics of spraying with Bordeaux mixture.

174. An increased use of fertiliser and increased attention to cultivation have resulted in a generally better appearance of the trees.

175. *Manurial Trials*—An experiment on the Central Experiment Station on the use of fertilisers shows that while an excellent response may be obtained by the addition of Ammonium Sulphate, certain undesirable features, such as increased dieback may also be produced. The dieback can be prevented to a very large extent, if not completely, by the use of Magnesium-containing fertilisers in conjunction with a spray treatment of Zinc and Manganese. The symptoms that are prevented by these metallic elements do not altogether agree with those recorded for these same elements in the U.S.A.

176. *Dying Out of Limes*—The dying out of limes continues. Experiments are in progress on this question and encouraging results have been obtained. Replies received to the questionnaires sent out by the West Indies Limes Association have been studied and it is becoming increasingly evident that dying out is not restricted to any particular set of conditions nor is it associated with any particular pest or organism. It is a condition peculiar to the lime, for limes budded onto Sour orange stock may die back completely to the graft union, while the stock remains alive and well, and may put out vigorous shoots, leading to the establishment of a Sour orange tree. Shade may delay but does not prevent dying out. It should be noted in this connection that shade *does* reduce crop considerably.

Coconuts

177. *General*—A very successful tour of the coconut area of the Island was arranged in October for a party of coconut growers, representing the main areas. The growers appreciated the opportunity of seeing the different estates and discussing problems on the spot, and much useful information was collected.

178. Yields range from 750 lb. copra per acre on the North Coast to almost 3,000 lb. per acre in the Icacos area.

179. There is a very wide variation in nut types. Much of the original planting material is believed to be of Venezuelan origin, but there have been small introductions from many parts of the world including Malaya and Madagascar. Copra per 1,000 nuts varies on an estate scale from 300 to 450 lb. per 1,000 nuts, but individual trees yield far higher than this. Several trees have been noted which give 12 oz. or more of copra per nut.

180. If these better types can be propagated from seed, there is hope for considerable improvement in Trinidad's copra industry. A coconut selection scheme is under way in which nuts from high bearing trees from all areas will be planted at the Central Station. There are no hard and fast rules for selection, but outstanding palms in each area are being selected.

181. An experiment has been started on a private estate to compare the results of planting nuts from selected trees with planting nuts selected for size and other characteristics from heaps of nuts collected for splitting for copra manufacture, most estates in practise using the latter procedure.

Rice

182. *General*—The shortage of rice from outside sources has focussed attention on local production of rice. It has already been demonstrated that Trinidad's rice yield can be at least as good as the average for most tropical countries.

183. Examination of samples of locally produced rice show that they are mixtures of varieties and that there is almost always a fair proportion of red grains present. Selection programmes have been started, using mass selection as well as single head selection so that pure strains can be isolated. These should help in harvesting and in milling as well as making possible selections for higher yields.

184. At least three types of rice will be required in Trinidad. One type will be required for areas where water can be controlled through irrigation. In these areas it should be possible to arrange beforehand the rice growing programme, and it may also be possible to obtain a second crop in such areas, either from ratoons or from new plantings.

185. On land which depends on local rainfall for flooding, the seed planted should be more tolerant in the matter of water supply, in that there may be too much with deep flooding, or insufficient for proper flooding.

186. Then again there is a good deal of land which gets some water but not enough for true swamp rice. Experiments last year have shown that some of the so-called hill rices can do very well in such circumstances. The possibilities for mechanical cultivation and reaping are higher with these hill rices than with the swamp rices.

187. A time of planting experiment using a well known Trinidad type—Joya—has shown that the vegetative period decreases very appreciably, the later in the year the rice is planted, and that yields are related to the vegetative period.

Vegetables

188. *Tomatoes* grow well during the dry season but are difficult in the wet. Trials have been conducted to see whether the difficulties in the wet season could be surmounted by growing under glass, but the results have not been encouraging. Plants near the edge of the roof and which therefore received more light than those further under the roof bore more fruit than the latter, but yields did not approach dry season standards. There were considerable varietal differences under wet season conditions. It seems clear that, apart from the question of pests and diseases, the strains of tomatoes now available are unsuitable for wet season culture.

189. One variety, however, (Wonder of Italy) has consistently set large numbers of small pear shaped fruit. The flavour of these fruits differs somewhat from that of the standard commercial varieties, such as Marglobe, but the variety has been crossed with large fruited forms in the hope that a satisfactory wet season tomato can be evolved.

190. *Yams* are notoriously a 'hard work' crop both in planting and in reaping and in spite of high potential yields of the order of 10 tons per acre, are generally in short supply and command a high price, the present scheduled maximum price of the Lisbon type being 6 cents per lb. retail. At present values, the yield per acre could be worth well over a thousand dollars. When this figure is compared with the return from cane it is difficult to understand why more yams are not grown. It is realised that the cash outlay in providing manure and stakes for yams is high, but it is believed that the work involved is also a deterrent. Attempts have therefore been made to 'mechanise' yam cultivation. A furrow is cut with a double mould board plough, 'muck' or 'trash' spread into the furrow and then a single mould board is used to throw the earth back over the furrow, and form a ridge in place of the furrow. Yams are then planted on the ridge and 'moulding up' can be done with the plough until the yams are staked. The tubers formed under this cultivation do not go deep into the ground, but tend to grow above ground as the height of the ridge sinks during the season and they can usually be pulled out without too much difficulty. Unfortunately, although yields by this method are as good as by the more laborious standard method of trenching, the yams produced have so far been more irregular in shape. It may be that the trash used for filling the furrow does not break down so well near the surface as when buried several inches, particularly in a dry year, and that undecomposed stems, etc. cause the irregularities in yam shape.

New Crops and New Varieties of Existing Crops

191. There is an urgent necessity for new high value cash crops for use on lands which are no longer recommended for cocoa. Tonca Beans (*Dipteryx Odorata*) have been planted over a considerable area, but market values have fallen and are erratic and in many cases, the crop is not being reaped.

192. *Nuts*—There are excellent world prospects for nuts for confectionery purposes, for edible oils and such luxury commodities as perfumes. Nut crops have usually large labour requirements and high labour costs may make their cultivation uneconomical. Brazil nuts (*Bertholletia excelsa*), Sapucaia nuts (*Lecythis Zabucajo*) and Cashew nut (*Anacardium occidentale*) are well known here and the two latter ones have been tried on an appreciable scale with indifferent results. Small plantings of other nuts including Queensland nut (*Macadamia ternifolia*), Peli nut (*Canarium commune*) and Butter nut (*Caryocar nuciferum*) are being made at several sites in the Colony for observation purposes.

193. *Oil Bearing Crops*—Oil crops under investigation include Soya bean, sesame, sunflower. The first has reached a stage where limited commercial cultivation can be recommended but with the other two, new local strains will have to be developed. Oil palm seeds (*Elaeis guincensis*) have been introduced with a view to developing a crop which can give some return from lands now occupied by Cocorite scrub.

Poultry Foods

194. Concurrently with the attempt to develop new crops, particularly for the smaller grower, there have been investigations as to how such crops could be most effectively utilised. It has been shown that combinations of local cereals (maize, adlay and rice) with local vegetable protein concentrate—coconut and Soya bean meal—do not form a satisfactory poultry food. The mixture requires the addition of a proportion of animal protein. Rum vat yeast will not supply this deficiency, skim milk or fish meal will. The establishment of a local fish or meat industry would be of great use to the Colony.

Shark Liver Oil

195. Experimental lots of shark liver oil have been prepared and tested. The vitamin potency varies greatly, but almost all samples of oil contain sufficient to pay for their extraction.

Froghopper Control Technique using D.D.T.

196. The following technique for the control of froghopper was that employed on the Woodford Lodge Estates, Trinidad, in 1947 and estate authorities are to be congratulated on the very effective control obtained.

197. Each and every field on the estate's 2,300 acres was inspected frequently and an estimate of the intensity of population of adult froghoppers made.

198. Population density was estimated by counting the froghoppers on five groups of eight single canes. One group was selected near each of the four corners of the field and one about the centre of the field.

199. So long as the count remained low and stationary, no dusting was undertaken, but when the count began to rise or where the actual count showed over fifteen froghoppers per forty canes, the field was dusted.

200. This counting technique is a simplified version of that described by the Department's Entomologist, Mr. A. Pickles in "Tropical Agriculture", Vol. XXIII, 1946, pp. 9-11.

201. Dusting was carried out by a Messinger Duster drawn and powered by a track type tractor of considerable horsepower.

202. Dusting was carried out in the late evening hours, when winds are low and when convection currents no longer rise from the cane fields.

203. With the technique employed, dust could not be projected to cover a distance much greater than 100 yards.

204. The dust found to give satisfactory control consisted of fifty per cent. wettable D.D.T. diluted with five times its weight of ground limestone passing 100 mesh. Five pounds of the D.D.T. preparation and twenty-five pounds of limestone were applied per acre in two dustings. The blower passed along the windward trace or traces and dusted the near portion of the field. It then retraversed this route with the nozzle of the blower raised to cover the more remote part of the field.

205. The dust drifted on the breeze across the field and rapidly settled out—hence the maximum effective coverage depth of 100 yards. No determination has been made of the actual distribution of D.D.T. by this method, but it is known that satisfactory control of froghopper has been attained.

206. Froghopper is greatly reduced, although not entirely eliminated by this technique, and the population remains at a very low level for a week to ten days after dusting. After this period, counting to guard against fresh outbreaks must be resumed.

207. The cost of control, exclusive of depreciation on equipment and management is estimated at about $3.00 per acre per dusting. A blower averages some 20 acres per hour.

Veterinary

Proclaimed Diseases

208. There were no outbreaks of proclaimed diseases during the year. One suspected case of *Anthrax* was reported from Mayaro but on investigation it proved to be negative.

209. *Swine Fever*—A reported case of Swine Fever proved negative so that the incidence of this disease was nil compared with 32 cases reported in 1946. Vaccination with Crystal Violet Vaccine has been carried out regularly at Government Stock Farms, especially on young pigs as soon as they are weaned. Vaccination was also carried out in the country and 237 pigs were vaccinated.

210. *Tuberculosis*—Tuberculin testing was carried out throughout the Colony and 2,274 cattle were tested with 232 animals showing reactions. This testing is carried out primarily in connection with milk for sale and all reactors are slaughtered, Government paying partial compensation.

211. Amongst animals tested at the Government Stock Farm, some were found on Post Mortem examination to be non-specific reactors, that is they reacted to the tuberculin test but showed no visible lesions during necropsy; nor even were mycobacterium tuberculosis (bovine) isolated by the Pathologist after guinea pig inoculations. The number of reactors quoted above does not therefore necessarily reflect the number of active bovine tuberculosis cases.

Non-Proclaimed Diseases

212. *Laryngo-Tracheitis*—This disease seemed to have been stamped out at the Trinidad Stock Farm as there was no evidence of the disease during the year.

213. *Internal Parasites*—Mortality from internal parasites still continues to be high among the peasant animals, but breeders are becoming conscious of the benefits to be derived from phenothiazine. With more available supplies this will be brought under control.

214. *Brucellosis in Cattle. (Contagious abortion)*—The incidence of Brucellosis during 1947 was somewhat lower than the previous year.

215. *Mange*—Reinfections among animals at Government Farm, Trinidad, were few and readily responded to treatment.

216. *Granular Dermice Sores in Horses*—This condition which occurred among imported horses from Canada yielded very slowly to treatment but has been brought under control.

217. *Strangles and Influenza*—Very few cases were reported from the Sugar Cane Estates.

218. *Pneumonia and Diarrhoea (in calves)*—The incidence was greatly reduced among young calves at Trinidad Stock Farm. Temperature of calves was taken twice daily and affected calves were discovered early in the course of the disease and treatment produced quick recovery.

Bee-keeping

219. *General*—The staff of the Department includes an Inspector of Apiaries who controls beekeeping and acts in an advisory capacity. He maintains a demonstration apiary at the St. Augustine Station and supervises five other apiaries placed at departmental stations.

220. *Registered Apiaries*—Eighteen beekeepers registered their apiaries during the year bringing the total to 243 registered apiaries.

221. *Honey Production*—From returns received honey production totalled 238, 984 lb. of which 92,016 lb. were exported.

222. *Breeding Stock*—Twenty-one Queen Bees were imported from the U.S.A. during the year. These queens are received at the Department's apiary, inspected and transferred to new cages with fresh escorts and food before delivery to importers.

Boards and Committees

223. The Director of Agriculture continued his Chairmanship of the following Committees:—

Land Settlement Committee
Plant Quarantine Committee
Lands Advisory Committee
Ad Hoc Committee on Rural Housing
Sugar Cane Investigation Committee
Copra Committee.

He was also Vice-Chairman of the Cocoa Board, the Board of the Agricultural Bank and the Nutrition Committee.

224. The Director and senior members of his staff also served as members on many other Committees.

Staff Notes

225. The following appointments were made during the year:—

Agricultural Officer on the 5th October by the appointment of Mr. G. P. Blair.
Agronomist on the 1st November by the promotion of Mr. M. N. Lucie-Smith, Agricultural Officer.
Agricultural Officer (Personal Assistant) on the 14th July by the appointment of Mr. E. D. Hill who had formerly served in the Gold Coast. Mr. Hill, however, tendered his resignation on December 3rd.

226. At the end of the year, the following vacancies existed:—

Sugar Agronomist
Agricultural Officer (2)
Veterinary Officer (2)
Marketing and Cooperative Officer
Plant Pathologist
Entomologist
Soil Survey Officers (2).

227. Mr. J. C. Muir, Director, proceeded on vacation leave in August and news was later received of his pending transfer to Tanganyika Territory as Director.

228. Other transfers accomplished or notified during the year were Mr. C. A. Thorold, Plant Pathologist, to the Gold Coast, Mr. A. E. Trotman, Marketing and Cooperative Officer, to Jamaica as Deputy Director, and Mr. A. Pickles, Entomologist, to Nigeria and Mr. R. E. Dean, Manager, St. Augustine Station, to Hong Kong as Supervisor of Gardens.

229. Dr. T. A. des Iles, Veterinary Officer represented this Colony at the British West Indian Veterinary Conference held in Jamaica from February 25th to March 6th. Dr. E. Phillis, Chief Scientific Officer, was the official delegate to the Annual Meetings of the British West Indies Sugar Technologists and of the Barbados Cane Breeding Station held in Jamaica in September.

230. Mr. E. W. Leach, Deputy Director (Crop Husbandry) was elected President of the West Indian Limes Association (Incorporated) at its Annual General Meeting held in Trinidad in May.

E. W. LEACH,
Director of Agriculture.

26th June, 1948.

SECTION III—PUBLICATIONS

Care and Management of Dairy Goats (Revised Edition) by Dr. J. L. Shannon, D.V.M.

Restrictions on the Importation of Plants, etc. under the Plant Protection Ordinance, 1940—Departmental Leaflet No. 1 of 1947.

Flora of Trinidad and Tobago—Vol. 1 Pt. 8—Umbelliferae and Araliaceae.

Flora of Trinidad and Tobago—Vol. II, Pt. 3—Ebenales, Gentianales and Polemoniales (pars).

Flora of Trinidad and Tobago—Index Vol. I.

SECTION IV—LEGISLATION

	Date	References	Remarks
		AGRICULTURE	
Gazette Notice No. 27	2/ 1/47	Production of Cane Ordinance, 1946	Interim price of Farmers' Canes fixed at $6.00 per ton
Agricultural Credit Bank (Amendment) Ordinance, 1947 — No. 20 of 1947	30/ 5/47	Agricultural Credit Bank Ordinance, 1945	Absolving Bank of liability to repay Government amounts of any loans or advances which are recoverable in respect of loans made by Government to Agricultural Cooperative Societies, Agricultural Credit Societies, Advances under the Cocoa Industry Relief Ordinance and the Agricultural Industry Hurricane Relief Ordinance
Gazette Notice No. 157 of 1947 ...	19/ 6/47	Order under the Production of Cane Ordinance, 1946	Payment excess mileage of 25c. per ton mile to Hindustan cane farmers who supplied canes to Craignish and Ste. Madeleine Estates
Government Notice No. 196 Sugar Quotas (No. 3) Order, 1947	5/ 8/47	Sugar Quotas Ordinance, Ch. 23. No. 13	Allocation of local quotas 1.2.47 to 31.1.48
Gazette Notice No. 181 of 1947 Control of Copra (Amendment) Order, 1947	24/ 7/47	Control of Copra Order, 1946	Substitution of Comptroller of Customs and Excise for Controller of Imports and Exports
Gazette Notice No. 182 of 1947 Copra Products and Laundry Soap Control (Amendment) Regulations, 1947	24/ 7/47	Copra Products and Laundry Soap Control Regulations, 1943	Substitution of Comptroller of Customs and Excise for Food Controller
Gazette Notice No. 197 Production of Cane (Regulations of Returns) Order, 1947	5/ 8/47	Production of Cane Ordinance, 1946 (No. 61 of 1946)	Furnishing of returns on prescribed form by 15th August
Gazette Notice No. 225 Copra Products and Laundry Soap Control (Amendment) (No. 2) Regulations, 1947	2/ 9/47	Copra, Copra Products and Laundry Soap Regulations, 1943	Amendment to Regulation 4 granting annual licences terminating 31st December in each year and payment of a fee of $4.80 for each licence